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On the taxonomic status of two giant cockroaches of *Bionoblatta* (Blattodea, Blaberidae) collected by José Pinto da Fonseca, a founder of the Brazilian Society of Entomology

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Abstract

The blaberids *Parahormetica hylaeceps* Miranda-Ribeiro, 1936 and *Bion mastrucatus* Rehn, 1937 were described in the 1930s from single males collected by José Pinto da Fonseca (JPF) in the 1910s. Both specimens came from the region of Mariana municipality, Minas Gerais State, an ecotonal formation between the Atlantic Forest and Cerrado domains in southeastern Brazil. Recently, *P. hylaeceps* was transferred to *Bionoblatta* Rehn, 1940, and its strong morphological similarity with *Bion mastrucatus* (already in *Bionoblatta*) was highlighted, indicating the need to investigate the validity of these names. Here, we addressed this question by analyzing photos of the type material, comparing original descriptions, and examining data on both the collecting site and the collector's history. We conclude that *Parahormetica hylaeceps* should be considered a senior synonym of *Bion mastrucatus* **syn. nov.;** hence, the valid name should be *Bionoblatta hylaeceps* (Miranda-Ribeiro, 1936). We also provide a new diagnosis, synonymy, and review of the distribution of this species, finding *Bionoblatta hylaeceps* to be endemic to the Itacolomi Peak region. We also present a short account of the work of JPF, including his relevance to Brazilian entomology and itinerary for collecting these specimens. *Bionoblatta* have five poorly known species of blaberids that, despite recent advances in the genus taxonomy, are still pending review.

Keywords

Blaberinae, Brachycolini, Neotropical, nomenclature, systematics, taxonomy, trilobite cockroaches, Zetoborinae

Introduction

Scientific collections are of great importance to the development of scientific thinking and have been used in collections-based science from the 18th century to the present day (see Funk 2018). Specimens held in natural history collections provide the primary data for understanding the natural world through studies on biodiversity, and they are mandatory to meet the requirements of scientific practices (e.g., vouchers and type specimens; see Huber 1998, Halm 2023, Nanglu et al. 2023).

Natural history collections are the result of centuries of contributions from many collectors and naturalists, with José Pinto da Fonseca (1896–1982, hereafter JPF) among them. JPF was an important collector and preparator of birds (Vasconcelos et al. 2014) as well as a memorable Brazilian entomologist (Ide et al. 2005). From 1911 until 1919, he centered his scientific collection efforts around the Mariana municipality, Minas Gerais State, Brazil (Martins 1982, Vasconcelos et al. 2014). Among the material he collected in that region are some cockroaches that were recognized a few years later as new taxa—*Parahormetica hylaeceps* Miranda-Ribeiro, 1936 and the genus *Bion* Rehn, 1937, which included *Bion mastrucatus* Rehn, 1937 as its single species (Miranda-Ribeiro 1936, Rehn 1937).

Parahormetica hylaeceps was described based on a single male collected by JPF from Mariana municipality in the state of Minas Gerais, Brazil. The holotype was deposited in the Museu Nacional, Federal University of Rio de Janeiro (MNRJ), and was lost in the catastrophic fire of 2018 (S. F. Lopes 2021, personal communication; see Kury et al. 2018 and De Almeida et al. 2021 for additional data on the impact of the fire on the entomological collection).

In turn, *Bion* and its single species, *Bion mastrucatus*, were described based on a single male from "Serra do Itacolomi" in Mariana Municipality also collected by JPF, with the locality originally indicated mistakenly as the state of São Paulo by Rehn (1937). This record was corrected years later by Gurney (1955: 272) who indicated Itacolomi as located in the state of Minas Gerais. Just a few years after its description, Rehn (1940) renamed the genus *Bion* to *Bionoblatta* Rehn, 1940, after discovering it as a homonym of *Bion* Cambridge, 1898, a genus of orb-weaver spiders (Araneae, Araneidae).

We recently transferred *Parahormetica hylaeceps* to *Bionoblatta* based on characters from the original description and examination of a photo of the habitus of a male, which was considered its putative holotype (Polizeli and Pinto 2024). We also pointed out the strong morphological similarity between the putative holotype of *P. hylaeceps* and the holotype of *Bion mastrucatus* and suggested that the status of the two nomina should be investigated. Because both specimens were collected by JPF at practically the same site

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and because of the strong similarities between the original descriptions (see Miranda-Ribeiro 1936, Rehn 1937), we acknowledged the need for a reassessment of their status as two distinct species.

Today, both *Parahormetica hylaeceps* Miranda-Ribeiro, 1936 and *Bion mastrucatus* Rehn, 1937, are combined with *Bionoblatta* (Polizeli and Pinto 2024). After transfers and descriptions of new species throughout the years, *Bionoblatta* now includes six species of brachypterous blaberids, all with a hormeticoid shape. They are endemic to the Atlantic Forest in Southeastern Brazil (see Gurney 1955, Rocha e Silva Albuquerque 1957, Polizeli and Pinto 2024). Thus, as part of the ongoing taxonomic revision of *Bionoblatta*, the goal of this study was to address the taxonomic status of *Parahormetica hylaeceps* and *Bion mastrucatus*.

Materials and methods

We evaluated the taxonomic validity of *P. hylaeceps* and *Bion mastrucatus* by comparing the original descriptions, available images of the holotypes of *Bionoblatta* species, original data from the collecting site, and the collector's history. The nomenclature was evaluated following the International Code of Zoological Nomenclature (ICZN 1999).

The original descriptions of Miranda-Ribeiro (1936) and Rehn (1937) were critically analyzed and compared to identify the proposed characters present in both descriptions. Photos of the holotype of *Bion mastrucatus* and the putative holotype of *Parahormetica hylaeceps* (Fig. 1) were also utilized to determine the proposed characters as listed in Table 1. Outlines of terminalia (Fig. 2C) were made based on photos of specimens or illustrations from the original descriptions. Morphological terminology was largely based on Polizeli and Pinto (2024), while the areas of the wings (e.g., humeral) follow Li et al. (2018).

A photo from the MNRJ of a male identified as *P. hylaeceps* was sent to us by Sonia Maria Fraga Lopes. The photo was taken by Edivar Heeren de Oliveira in the 2010s, but not as part of the digitization collections project of the MNRJ (S. Lopes and E. Oliveira 2021, personal communication; see also De Almeida et al. 2021 for data on the digitization collections project). This assumed holotype was lost in the fire of 2018 (S. Lopes and E. Oliveira 2021, personal communication). To help investigate the status of the name-bearing type of *P. hylaeceps*, we compared this photo with the original description to determine whether the original description was based on that particular specimen. Photos of the *Bion mastrucatus* holotype, taken by Heidi Hopkins, are available in the Cockroach Species File – CSF (Beccaloni 2023) under Creative Commons Attribution 4.0 International License (CC-BY).

A review of the literature and a search for specimens in collections were conducted using digital databases (e.g., Biodiversity Heritage Library, Google Scholar, GBIF, and Taxonomic Catalog of Brazilian Fauna). Search terms included the full names *Bionoblatta mastrucatus* and *Parahormetica hylaeceps* and the keywords "Bionoblatta," "Parahormetica," "hylaeceps," "mastrucatus," and "mastrucata," which were searched for individually and in combination.

Abbreviations of institutions.—

ANSP Entomology Collection of the Academy of Natural Sciences of Drexel University, Philadelphia, United States of America;

MNRJ Entomological collection, Department of Entomology, Museu Nacional, Federal University of Rio de Janeiro, Rio de Janeiro, Brazil;

MZSP Entomological collection, Museum of Zoology, University of São Paulo, São Paulo, Brazil.

Results

Based on our comparison, there is no evidence to support the taxonomic validity of the two names; thus, they should be treated as a single taxon. Based on the principle of priority (Art. 23, ICZN 1999), *Parahormetica hylaeceps* Miranda-Ribeiro, 1936 has precedence over *Bion mastrucatus* Rehn, 1937, which is deemed its junior synonym. A synonymy, catalog, status of the type material, diagnosis, remarks about the provenance of the specimens, and updated distribution are presented in the sections below.

The comparative analysis of both original descriptions and the specimens' photos (Figs 1, 2, Table 1) validated the strong morphological similarity between *Bion mastrucatus* and *Parahormetica hylaeceps*. Many characters used by Rehn (1937) to characterize and diagnose *Bion mastrucatus* are similar to those in the original description of *P. hylaeceps* (Table 1), including the following major characters (character numbers in Table 1 are shown in parentheses): Head – (1) anterior surface of head reddish-brown to dark brown, (2) with pale orange brown spots; Pronotum – (6) a pair of anterolateral diskal tubercle-like processes (DTP); (7) posterior margin of diskal horseshoe-like process (DHP) adjacent to posterior margin of pronotum; (8) inner area of disk reddish-orange; (9, 10) lateral portion of pronotum with a pale orange elongated spot on dorsal and ventral surfaces; Tegmina – (12) short, not touching nor overlapping mesially and largely rounded; (13) rough, with dense and deep punctuation; (14) overall color dark brown with humeral area reddish-brown; (15) no venation with ill-defined veins basally at radial area; Abdomen – (19) dorsal surface densely rugose, covered with callosities and rough and (20) narrowly bordered of reddish-orange; (21) supraanal plate orange ochre dorsally; Dimensions – (25) total length of approximately 35 mm; (26) length of pronotum 12 mm, (28) length of tegmina 10.5 mm. Futhermore, the specimens were collected by the same collector at the same site (see below on José Pinto da Fonseca and the provenance of these specimens) which supports our conclusion.

On the putative holotype of Parahormetica hylaeceps—A photo taken in the 2010s by Edivar Heeren de Oliveira (EHO) of a male specimen held in the MNRJ that was identified as *P. hylaeceps* was sent to us by Sonia Maria Fraga Lopes in 2021 (Fig. 1D). Although it is unclear if this specimen contains labels, they were not photographed. This photo is the only information about this species, apart from the original description, to survive the fire at MNRJ (Sonia Maria Fraga Lopes 2021, personal communication).

The careful comparison of the putative holotype and the original description and illustration of *P. hylaeceps* (see Table 1) reveals a strong similarity among them. The major similarities are the tip of tegmina reaching the second abdominal segment (Fig. 1) exactly as was mentioned by Miranda-Ribeiro (1936); the shape and arrangement of the supraanal and subgenital plates (Fig. 2); and the coloration of the supraanal plate and posterior margin of the subgenital plate (Fig. 1; see fig. 2 in Miranda-Ribeiro (1936)). Although caution is needed when analyzing the illustrations of the supraanal plates drawn by Miranda-Ribeiro due to reputed inaccuracies (see Gurney 1955), we noted much similarity between the terminalia illustrated and the photo (Fig. 2). Moreover, some of the proportions of the specimens are also similar (total length/pronotum maximum width = 1.84 vs. 1.86; total length/tegmina length = 3.33 vs. 3.13; pronotum maximum width/tegmina

Table 1. Characters of holotypes of *Bion mastrucatus* and *Parahormetica hylaeceps* and the putative holotype of *Parahormetica hylaeceps* (in MNRJ, without data). Data extracted from original descriptions by Miranda-Ribeiro (1936) and Rehn (1937); those from the putative holotype of *Parahormetica hylaeceps* is from this study. n.o. = Not observed. Characters from Miranda-Ribeiro (1936) adapted from Portuguese.

	Character / Specimen	*Bion mastrucatus*	*Parahormetica hylaeceps*	Putative holotype of *Parahormetica hylaeceps*
1.	**Coloration of anterior surface of head**	Liver-brown	Dark reddish-brown	n.o.
2.	**Pale spots at anterior surface of head**	Four paired dots of vinaceous-rufous placed immediately mesad of antennal scrobes and at proximo-lateral angles of clypeus	A light reddish-brown spot lateral to the base of antenna, and another below	n.o.
3.	**Antennae coloration**	Pitch-brown	Dark reddish-brown (incomplete)	n.o.
4.	**Pronotum**	Median length faintly less than three-fourths the greatest breadth […] general arcuation	Large, wide, convex and parabolic	Wider than long, semicircular
5.	**Anterior margin of pronotum**	Dorsal recurving, thickening	Strongly protruded upward	Projected dorsally (upwards)
6.	**Diskal anterolateral tubercle-like processes (DTP)**	Pair of elevated, smoothly but not glabrously rounded, large boss-like tubercles	Pair of very large smooth tubercles	Pair of large and smooth (rounded) tubercles
7.	**Posterior margin of diskal horseshoe-like process (DHP)**	In contact with the caudal margin of the pronototum from which it is separated by a narrow sulcation	Almost fused (undifferentiated) to the posterior margin of pronotum	Adjacent to posterior margin of pronotum
8.	**Inner area of disk coloration**	Auburn to orange- rufous	Testaceous, reddish- yellow	Reddish-orange
9.	**Pronotum coloration laterally to the DHP (dorsal view)**	Lateral crescents […] auburn to orange-rufous	Elongated reddish-yellow spot, testaceous	Pale orange
10.	**Pronotum coloration in ventral view**	Broader crescents of zinc orange to vinaceous-rufous	Elongated reddish-yellow spot, testaceous	n.o.
11.	**Scupturation around the disk**	Criboso-punctate	Wrinkled (rugose)	Rough [?]
12.	**Tegmina**	Subcircular, separated mesad	Trapezoidal-like with rounded angles [...] posteriorly reaching the second abdominal segment	Subcircular, not touching nor overlapping mesially, tip reaching the second abdominal segment
13.	**Scupturation of dorsal surface of tegmina**	Deeply impressed criboso-punctate	Shagreen-like [rough]	Rough, with dense and deep punctuations
14.	**Tegmina color**	Dark brown with humeral area reddish-brown	Dark reddish-brown, lighter towards to the humeral area	Dark brown with humeral area reddish-brown
15.	**Humeral trunk [Radial area]**	A cicatriform ridge, definite only proximad	Strong, elevated, with two branches disappearing distally	Visible as a carina
16.	**Humeral area [marginal field]**	Broad, almost equal in width to a third of the entire tegmen, its dorsal surface appreciably concave	Wide with thickened margin [carinated]	Wide, concave, with thickened margin [carinated]
17.	**Hind wings**	Wings rudimentary, present but hidden beneath tegmina	Scale-like, vestigial, almost wingless	n.o.
18.	**Meso- and metathorax coloration**	Liver-brown, each crossed by a narrow wavering band of zine orange	Reddish-yellow, [testaceous], with black marks	Reddish-orange, with brown to black marks
19.	**Scupturation of dorsal surface of abdomen**	Strongly coarsely and irregularly eroso-shagreenous to strongly rugose	Rugose	Densely rugose, covered with callosities and rough
20.	**Dorsal surface of abdomen coloration**	Narrowly bordered with madder brown	Dark brown to black, very finely bordered by reddish-brown	Dark brown, bordered by reddish-brown
21.	**Supraanal plate coloration**	Dull zine orange	Reddish-yellow, [testaceous]	Pale orange
22.	**Subgenital plate**	Subtrigonal, [...] apex well rounded	Rounded triangular	Not visible [Posterior margin rounded]
23.	**Legs coloration**	Vinaceous-rufous to mahogany red	Reddish-brown	Reddish-brown
24.	**Legs spurs coloration**	Color of tibiae proximad [reddish-brown], becoming pitch brown distad	Dark brown	Reddish-brown to dark brown, tip black
25.	**Total length (mm)**	35.5	35	n.o.
26.	**Pronotum maximum length (mm)**	12	12	n.o.
27.	**Pronotum maximum width (mm)**	16.9	19	n.o.
28.	**Tegmina length (mm)**	10.5	10.5	n.o.

length = 1.80 vs. 1.67), but some are distinct (total length/pronotum maximum length = 2.91 vs. 3.43; pronotum maximum width/pronotum maximum length = 1.58 vs. 1.84; pronotum maximum length/tegmina length = 1.14 vs. 0.91). Minor differences in proportions may be caused by variations in measurement acquisition and position of the measured structures. Taken together, these evidences led us to the conclusion that the photo should be used as the main representative of the specimen described and illustrated by Miranda-Ribeiro (1936), as anticipated by Polizeli and Pinto (2024).

Bionoblatta Rehn, 1940

Bion Rehn, 1937: 252 (original description, homonym of *Bion* Cambridge, 1898).
Bionoblatta Rehn, 1940: 60 (replacement of homonym by a new substitute name).

Zoobank.—http://zoobank.org/NomenclaturalActs/BB0A6D6B-E9E3-4334-8746-4268FDA173D3

Type species.— *Bion mastrucatus* Rehn, 1937 (by original designation), a junior synonym of *Parahormetica hylaeceps* Miranda-Ribeiro, 1936.

Generic composition.—(see discussion) *Bionoblatta diabolus* (Saussure, 1864), *Bionoblatta hylaeceps* (Miranda-Ribeiro, 1936), *Bionoblatta itatiayae* (Miranda-Ribeiro, 1936), *Bionoblatta oiticicai* Rocha e Silva Albuquerque, 1957, and *Bionoblatta punctata* (Saussure, 1873).

Bionoblatta hylaeceps (Miranda-Ribeiro, 1936)
Figs 1A–D, 2A–C

Parahormetica hylaeceps Miranda-Ribeiro, 1936: 218–219, fig. 2 (description of male holotype from Mariana municipality, Minas Gerais State, Brazil in MNRJ 14250); —Camargo-Andrade (1937: 794, mention); —Princis (1963: 118, catalog); —Rocha e Silva Albuquerque (1964: 4, checklist to Brazil, record to Rio de Janeiro State); —Rocha e Silva Albuquerque (1982: 3, checklist to Rio de Janeiro municipality); —Pellens and Grandcolas (2008: 57, catalog to Brazil); —Lopes et al. (2009: 231, record from Rio de Janeiro State based on Rocha e Silva Albuquerque 1982).
Bion mastrucatus Rehn, 1937: 208, 253–256, 258 (description of male holotype from Serra do Itacolomi [state of Minas Gerais], Brazil in MZSP [probably under loan to ANSP], figs 18, 22, 29, subgenital plate and tip abdomen in ventral view and habitus in dorsal view); —Zompro and Fritzsche (1999: 212, mention). **syn. nov.**
Bionoblatta mastrucatus (Rehn, 1937): —Rehn (1940: 60, comb. nov.); —Rocha e Silva Albuquerque (1964: 5, record to Minas Gerais); —Polizeli and Pinto (2024: 4, 6, figs 1d–f, taxonomic notes, photos of tegmina and abdomen of holotype in dorsal view).
Bionoblatta mastrucata (Rehn, 1937): —Gurney (1955: 272, 277, key and remarks about type locality); —Rocha e Silva Albuquerque (1957: 408, key and synonymic list); —Princis (1963: 119, catalog); —Vanschuytbroeck (1969: 5, mention); —Pellens and Grandcolas (2008: 48, catalog to Brazil).
Bionoblatta hylaeceps (Miranda-Ribeiro, 1936): —Polizeli and Pinto (2024: 280, comb. nov.).

Zoobank.—http://zoobank.org/NomenclaturalActs/025457AE-67E6-47D3-87F4-C8D6E3E68093

Type material.— *Parahormetica hylaeceps* **Holotype** (by monotypy): BRAZIL • ♂; Minas Gerais State, Mariana municipality; José Pinto da Fonseca leg.; MNRJ 14,250. Lost in the fire of 2018 (S. F. Lopes, 2021, personal communication; see remarks).

Bion mastrucatus **Holotype** (by original designation): BRAZIL • ♂; [Minas Gerais State, Mariana municipality], Serra do Itacolomi; Apr. 1919; José Pinto da Fonseca leg.; MZSP 22,074, provisionally in ANSP Type 9,367. Examined by photos (Fig. 1A–C).

Diagnosis.— *Bionoblatta hylaeceps* is a dark and reddish-brown hormeticoid-shape brachypterous blaberid; tegmina largely rounded, reaching the anterior margin of the second abdominal segment and almost touching mesialy, dorsal surface deeply punctuated, coloration dark brown, humeral area reddish-brown; small arolium; dorsal surface of the abdomen densely rugged and with few callosities, coloration dark brown, dull, except for narrow reddish-brown lateral borders. The inner area of the disk and the lateral pale portion of the diskal horseshoe-like process (DHP) of pronotum reddish-orange, as well as the orange-ochre supraanal plate, may help in its identification. Based on the coloration pattern, *Bionoblatta hylaeceps* resembles the poorly known *Bionoblatta punctata* (Saussure, 1873), causing misidentification. It is possible to differentiate *B. hylaeceps* from *B. punctata* by its large, rounded, oval-like tegmina, largely dark brown with humeral area reddish-brown (tegmina possibly trapezoidal, black colored with brown humeral area in *B. punctata*); abdomen dark brown, narrowly bordered in reddish-orange dorsally (black in *B. punctata*) and legs reddish-brown (black in *B. punctata*).

José Pinto da Fonseca (JPF) and the provenance of the specimens of Bionoblatta—JPF was born in the Mariana municipality in the state of Minas Gerais, Brazil in 1896, and soon thereafter his family moved to Lorena in the state of São Paulo (Martins 1982). The day and month of his birth are not clear, as there are two dates in the literature (see Martins 1982, Ide et al. 2005). At the age of 16, he returned to Mariana to study in the humanities, philosophy, and theology course at the Seminário de Mariana. At the institution, he began to dedicate himself to the knowledge of biological sciences, influenced by his mentors in natural sciences (Martins 1982). He collected many animal specimens, including insects, which were first sent to the MNRJ and later to the Museu Paulista (today, called the Museu de Zoologia da Universidade de São Paulo, MZSP) where he joined as a traveling naturalist in 1919 (see Martins 1982). Paulo Miranda-Ribeiro described *P. hylaeceps* based on a male individual deposited in the MNRJ and collected in Mariana municipality by JPF but did not specify the date of collection (Miranda-Ribeiro 1936). Interestingly, Alípio de Miranda-Ribeiro, Paulo's father, recommended JPF as a traveling naturalist to the director of the Museu Paulista (Martins 1982, Pombal Jr. 2002). We assume that the holotype of *P. hylaeceps* deposited at the MNRJ was collected before 1919 but after 1912, indicating that it was collected before JPF began sending specimens to the Museu Paulista.

JPF collected the holotype of *Bion mastrucatus* in 1919 and sent it to the Museu Paulista. This material was deposited in that institution with collection number #22,074 and recorded in the catalog of the collection with natural history notes that reveal unpublished data about the biology of this species (Fig. 2A, B). Based on free translation from Portuguese, these notes read as follows: "These Orthopteros were found by José Pinto da Fonseca in the highlands of the Serra do Itaculumy, about 300 m below the rock known as "Pedra Menina" [in the Itacolomi Peak]. They appear just when the sun is very strong [hot days], in such manner that is useless [looking for them] on a cold day." In his synopsis on *Bionoblatta*, Gurney (1955) claimed that this material was in the Museu Paulista (now MZSP); however, the material is currently at ANSP. It is likely that it was not returned to MZSP when borrowed for study by James Abram Garfield Rehn, who spent most of his career at ANSP (Gurney 1965), with the holotype remaining at that institution thereafter.

JPF had a remarkable career. At the end of 1920s, he was hired as a technical assistant in entomology at the Biological Institute of São Paulo and, during the same period, founded the Adolph Hempel Entomological Collection (Ide et al. 2005) at this institu-

Parahormetica hylaeceps
MNRJ: holotype?

Bion mastrucatus
MZSP: holotype

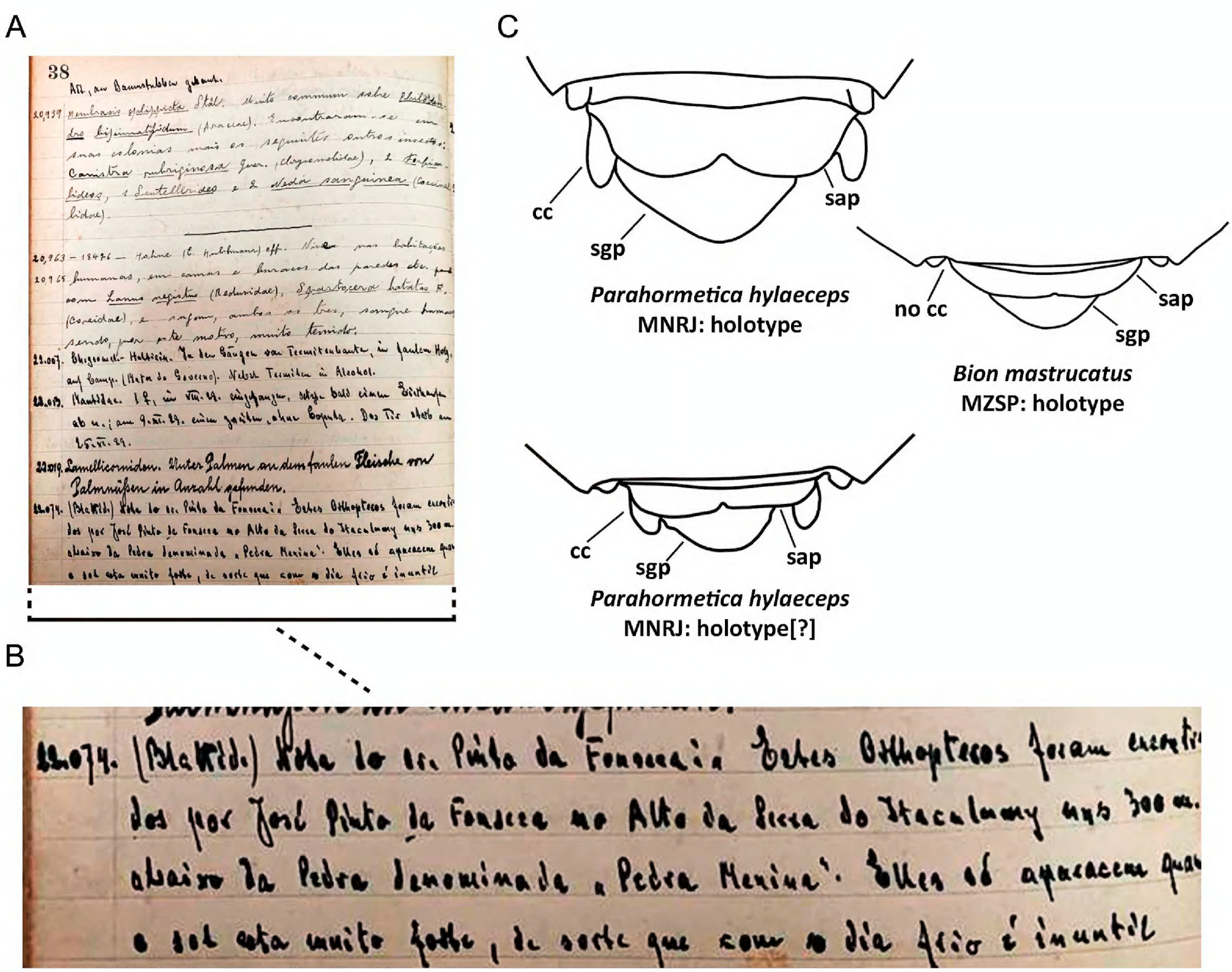
Fig. 1. Habitus and labels of the name-bearing specimen of *Bion mastrucatus* and habitus of the putative holotype of *Parahormetica hylaeceps*. **A–C.** Holotype of *Bion mastrucatus*: **A.** Dorsal view; **B.** Ventral view; **C.** Collection labels; **D.** Putative holotype of *P. hylaeceps* in dorsal view. **A–C.** Photos by H Hopkins, available in Cockroach Species File – CSF (Beccaloni 2023); **D.** Photo by EH de Oliveira.

tion. He was a pioneer of biological control in Brazil as a result of his studies on the use of the wasp *Prorops nasuta* Waterson, 1923 in the control of the "Broca-do-Café" (coffee berry borer), *Hypothenemus hampei* (Ferrari, 1867). In 1937, he became a founding member and first president of the Brazilian Society of Entomology (Carrera 1987), and in 1938, he became the chair of the Entomology Section of the Instituto Biológico, a position he held until his retirement in 1966. Over his prolific career, he published hundreds of studies, as compiled in Ide et al. (2005).

Distribution— *Bionoblatta hylaeceps* (cited as *P. hylaeceps*) has been recorded in many studies as present in the state of Rio de Janeiro (Rocha e Silva Albuquerque 1964, 1982, Pellens and Grandcolas 2008, Lopes et al. 2009); however, no voucher specimens have been reported in support of these records. Most only replicate the record from the seminal paper by Rocha e Silva Albuquerque (1964). In her paper of 1982, Rocha e Silva Albuquerque (1982) identified which records were based on the literature and which were based on voucher specimens, denoting the record of *P. hylaeceps* for Rio de Janeiro to be based on the literature. We believe the record of occurrence in Rio de Janeiro is a misinterpretation of the study of Miranda-Ribeiro (1936). Thus, it is suggested that this species be removed from the list of cockroaches recorded in the state of Rio de Janeiro pending evidence of *bona fide* specimens collected in this state.

As mentioned, the holotype of *Bion mastrucatus* was collected about 300 m below the rock known as Pedra Menina in the Itacolomi Peak, Mariana. While the holotype of *P. hylaeceps* was also collected in Mariana, there is no further information about the locality: the specimen and any additional data from the labels or field and collection notebooks were lost during the fire in the MNRJ. However, because *P. hylaeceps* was collected by the same person, in the same municipality, and around the same times as the *Bion mastrucautus* holotype, we are convinced it also came from the "Serra do Itacolomi." Thus, we consider *B. hylaeceps* endemic to the "Serra do Itacolomi" [Itacolomi Peak] in Minas Gerais State due to the records of this species being limited to that region.

Itacolomi Peak is located within the Itacolomi State Park pro- tected area, which was created by law no. 4,495 on June 14th, 1967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Alt, am Baumstubben gelaufn.
20,939 Membracis dilaspicta Stål. Muito commum sobre Eluteladus bijasmatifolium (Araceae). Encontraram-se em suas colonias mais os seguintes outros insectos: Canistra rubiginosa Guer. (Chrysomelidae), 2 Forficulidos, 1 Scutellinideo e 2 Nezara sanguinea (Coccinellidae).
20,963 – 18476 – Solenopsis (E. Holtzmanni) aff. Ninhos nas habitações humanas, em camas e buracos das paredes etc. pondo com Lamia negistus (Reduviidae), Eparthocera batatas F. (Coreidae), e ratazanas, ambos os bichos, sempre fugindo, por este motivo, muito temidos.
20,965
22.007. Rhizocauli-Holtzeia. Ja den Gängen von Termitenbauten, im faulen Holz, auf Campo. (Mata do Governo). Nebst Termiten in Alcohol.
22.013. Mantidae. 1 ♀, im VIII.99. eingegangen, obige bald einem Eidechsen ab u.; am 9.XII.99. einen zweiten, ohne Eopeka. Das Tier starb am 15.XII.99.
22.019. Lamellicornien. Unter Palmen an dem faulen Fleische von Palmnüssen in Anzahl gefunden.
22.074. (Blattidae) Feita lo sr. Pinto da Fonseca: Todos Orthopteros foram exemplares por José Pinto da Fonseca no Alto da Serra do Itacolomy uns 300 m. abaixo da Pedra denominada "Pedra Menina". Todos os apparecem quasi o sol esta muito forte, de sorte que como o dia frio é inutil
B
C
cc
sgp
sap
Parahormetica hylaeceps
MNRJ: holotype
no cc
sap
sgp
Bion mastrucatus
MZSP: holotype
cc
sgp
sap
Parahormetica hylaeceps
MNRJ: holotype[?]

Fig. 2. Page of catalog of the collections of Museu Paulista (now Museu de Zoologia da USP) and outlines of terminalia of specimens of *Bion mastrucatus* and *Parahormetica hylaeceps*. **A.** Page with record of entry of José Pinto da Fonseca's specimen to museum holding; **B.** Close up of the entry of the holotype of *Bion mastrucatus*; **C.** Outlines of terminalia based on original description illustration and photos from specimens. Abbreviations: cc = cercus, sap = supraanal plate, sgp = subgenital plate. **A, B.** Adapted from photo by AM Vasques.

and encompasses approximately 7,000 ha between the municipalities of Mariana and Ouro Preto (Minas Gerais 1967). Although we do not know the conservation status of this species, the type locality being within a protected area likely favors the maintenance of the population of this species.

Discussion

In this study, we formally proposed *P. hylaeceps* as a senior synonym for *Bion mastrucatus*, as suggested by Polizeli and Pinto (2024), thereby contributing to the biological understanding of two names related to the same area and treated as distinct species for approximately 90 years. As a result of this proposal, *Bionoblatta* now contains five species: *Bionoblatta diabolus* (Saussure, 1864), *Bionoblatta hylaeceps* (Miranda-Ribeiro, 1936), *Bionoblatta itatiayae* (Miranda-Ribeiro, 1936), *Bionoblatta oiticicai* Rocha e Silva Albuquerque, 1957, and *Bionoblatta punctata* (Saussure, 1873).

We believe that, even without the photo of the putative holotype for comparison, the data from the original descriptions of the two species and photos of the holotype of *Bion mastrucatus*, combined with provenance data, are sufficient to support this synonymy. We are aware that a photo of an unlabeled specimen should not be used as the sole source of evidence for the determination of a type specimen. However, the similarities among the three data sources (original descriptions, available images, and original data from the collecting site) strongly support the proposed synonymy.

Our study is an example of the importance of collection efforts in furthering our understanding of the extant biodiversity. With the re-study of these specimens, important taxonomic contributions to the knowledge of *Bionoblatta hylaeceps* were made. This study gives new meaning to a poorly known species with a lost holotype, provides new data about its natural history, increases our knowledge about its morphology, aids in the comprehension of local diversity, and facilitates further specimens' associations with *Bionoblatta* species. It also is an example of how the loss of biological and cultural collections—in this case, the loss of a heritage of more than 200 years and of 20 million artifacts due the fire at MNRJ—is a loss to human history, culture, and science (Zamudio et al. 2018).

Because our knowledge about *Bionoblatta* species is based solely on a few taxonomic surveys—almost entirely on the type specimens and original descriptions (see Rehn 1937, Gurney 1955, Rocha e Silva Albuquerque 1957, Polizeli and Pinto 2024)—it is still a poorly known genus. Thus, additional studies are necessary to increase our understanding of the taxonomy and phylogenetic relationships in *Bionoblatta*.

Author Contribution

Both authors contributed to the conceptualization, formal analysis, data curation, visualization of results, and review and editing of the manuscript. LP was responsible for the original draft. All authors approved the final draft of the manuscript.

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